

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) A method of reducing impact of transmission errors by means of a retransmission protocol, ~~the method characterized in that utilizing~~ a retransmission loop involving packet radio transmissions from user equipment to a control element connected to one or more radio base stations, wherein the user equipment radio transmissions ~~being~~ are received at one or more radio base stations for forwarding to the control element, the base station acknowledging, positively or negatively, transmissions from the user equipment and the control element acknowledging, positively or negatively, transmissions forwarded to it.
2. (Currently Amended) The method according to claim 1, wherein ~~characterized in that~~ for a process of retransmission, if same transmitted packet information content is received more than once, the received transmissions are combined.
3. (Currently Amended) The method according to claim 2, wherein ~~characterized in that~~ successive received packet transmissions of the same information content are combined in the base station prior to determining whether or not the radio base station should acknowledge the transmitted information content.
4. (Currently Amended) The method according to claim 2, wherein ~~characterized in that~~ whether or not the packet information content is the same is determined by means of a new data indicator.
5. (Currently Amended) The method according to claim 4, wherein ~~characterized in that~~ the new data indicator, accompanying packet information, is transmitted on a reliable control channel.

6. (Currently Amended) The method according to claim 2, wherein any of claims 2-5 characterized in that the process is identified by means of a process identity.

7. (Currently Amended) The method according to claim 6, wherein e-h characterized in that the process identity, accompanying packet information, is transmitted on a reliable control channel.

8. (Currently Amended) The method according to claim 1, wherein any of claims 1-7 characterized in that the control element reorders received packets.

9. (Currently Amended) The method according to claim 8, wherein e-h characterized in that the received packets are reordered into sequential order.

10. (Currently Amended) The method according to claim 9, wherein e-h characterized in that the sequential order is determined from RLC sequence number.

11. (Currently Amended) The method according to claim 9, wherein e-h characterized in that the sequential order is determined from MAC sequence number.

12. (Currently Amended) The method according to claim 1, wherein any of claims 1-11 characterized in that the method reduces delay of uplink transmissions, the delay being associated with the retransmissions.

13. (Currently Amended) A signal format for uplink transmissions from user equipment to radio base station of a radio communications system, wherein the signal format e-h characterized by comprises signal elements allowing radio base station reception combining and acknowledgment of successive received

transmissions concerning same data in uplink direction prior to forwarding received transmissions, the signal elements comprising:

- process identity,
- new data indicator, and
- payload,

wherein the new data indicator indicating indicates whether or not payload data of a process with identity as indicated by the process identity element has been transmitted previously.

14. (Currently Amended) The signal format according to claim 13,
wherein characterized in that the process identity and new data indicator elements are more strongly protected by a forward error control code than payload.

15. (Currently Amended) The signal format according to claim 13,
wherein or 14 characterized in that the process identity and new data indicator elements are transmitted on a control channel in synchronism with transmissions of the payload element.

16. (Currently Amended) The signal format according to claim 15,
wherein characterized in that the control channel is a shared control channel of a UMTS or WCDMA system.

17. (Currently Amended) The signal format according to claim 15,
wherein characterized in that the control channel is a dedicated control channel of a UMTS or WCDMA system.

18. (Currently Amended) The signal format according to claim 13,
wherein any of claims 13-17 characterized by the payload element comprising an integer number of radio link control protocol data units (RLC PDUs).

19. (Currently Amended) The signal format according to claim 13,
~~wherein any of claims 13-18 characterized in that the process identity, new data indicator and payload elements are arranged for uplink transmission in a transmission time interval shorter than 10 milliseconds.~~

20. (Currently Amended) The signal format according to claim 19,
~~wherein characterized in that the process identity, new data indicator and payload elements are arranged for uplink transmission in a transmission time interval shorter than 4 milliseconds, e.g. 2 ms.~~

21. (Currently Amended) A radio network controller of a radio communications system, comprising: ~~characterized by~~

- receive means for receiving one or more transmissions originated in a UE in uplink direction from one or more radio base stations where the one or more transmissions in uplink direction have been pre-detected according to an ARQ protocol,
- receive means, for receiving first protocol data units,
- buffering means, for buffering received first protocol data units,
- segmentation means, for segmenting received first protocol data units into second protocol data units,
- reassemble means, for reassembling second protocol data units into service data units,
- transfer means, for transferring service data units, and
- reordering means, for reordering first or second protocol data units.

22. (Currently Amended) The radio network controller according to any of claim 21, further comprising: ~~characterized by~~

- processing means, and
- transmit means,

the processing means being arranged to verify second protocol data units according to an error detecting code and the transmit means transmitting positive or negative ac-

knowledgments depending on whether or not the second protocol data unit is detected to be erroneous.

23. (Currently Amended) The radio network controller according to claim 21, ~~wherein or 22 characterized in that the reordering means rearranges the second protocol data units according to an RLC sequence number.~~

24. (Currently Amended) The radio network controller according to claim 21, further comprising any of claims 21-23 characterized by receive means arranged for receiving first protocol data units concerning a particular connection from a plurality of first protocol data senders.

25. (Currently Amended) The radio network controller according to claim 21, wherein any of claims 21-24 characterized in that the first protocol data units are MAC PDUs.

26. (Currently Amended) The radio network controller according to claim 21, wherein any of claims 21-25 characterized in that the second protocol data units are RLC PDUs.

27. (Currently Amended) The radio network controller according to claim 21, wherein any of claims 21-26 characterized in that the radio network controller is a radio network controller of a UMTS or WCDMA system.

28. (Currently Amended) A radio base station, comprising: ~~characterized by~~

- receive means, for receiving one or more first protocol data units,
- a protocol entity, for processing first protocol data units, and
- transmit means, for transmitting acknowledgments and for forwarding of first protocol data units.

29. (Currently Amended) The radio base station according to claim 28,
further comprising: characterized by

- buffering means, for buffering one or more first protocol data units.

30. (Currently Amended) The radio base station according to claim 28,
wherein or 29 characterized by the protocol entity being is arranged for verifying one or more first protocol data units according to a forward error control code, and depending on the outcome positively or negatively acknowledging to an uplink transmitting entity received first one or more protocol data units.

31. (Currently Amended) The radio base station according to claim 28,
further comprising any of claims 28-30 characterized by means for combining received first protocol data units, the protocol entity being arranged to verify the combined protocol data unit according to a forward error control code and depending on the outcome positively or negatively acknowledging to an uplink transmitting entity the latest received protocol data unit of the combination.

32. (Currently Amended) The radio base station according to claim 31,
wherein characterized in that the first protocol data units with same process identity are combined according to a received new data indicator.

33. (Currently Amended) The radio base station according to claim 28,
wherein any of claims 28-32 characterized in that the first protocol data units are MAC PDUs.

34. (Currently Amended) The radio base station according to claim 28,
wherein any of claims 28-33 characterized in that the radio base station is a radio base station of a UMTS or WCDMA system.

35. (Currently Amended) A user equipment apparatus of a radio communications system, comprising: characterized by

- assemble means for assembling one or more second protocol data units into one or more first protocol data units,
- buffering means for buffering first protocol data units,
- transmit means for transmitting first protocol data units according to an ARQ protocol,
- receive means for receiving one or more acknowledgments of first protocol data units, and
- receive means for receiving one or more acknowledgments of second protocol data units.

36. (Currently Amended) The user equipment apparatus according to claim 35, wherein characterized by the transmit means being is arranged to retransmit one or more first protocol data units if negatively acknowledged or not positively acknowledged within a predetermined time.

37. (Currently Amended) The user equipment apparatus according to claim 35, further comprising or 36 characterized by buffering means being arranged to release buffer space of one or more first protocol data units if positively acknowledged or not negatively acknowledged within a predetermined time.

38. (Currently Amended) The user equipment apparatus according to claim 35, further comprising any of claims 35-37 characterized by transmit means being arranged to transmit first protocol data units in transmission time intervals shorter than 10 milliseconds.

39. (Currently Amended) The user equipment apparatus according to claim 38, further comprising characterized by transmit means being arranged to transmit first protocol data units in transmission time intervals shorter than 4 milliseconds, e.g. 2 milliseconds.

40. (Currently Amended) The user equipment according to claim 35,
~~wherein any of claims 35-39 characterized in that the first protocol data~~
units are MAC PDUs.

41. (Currently Amended) The user equipment according to claim 35,
~~wherein any of claims 35-39 characterized in that the second protocol data~~
units are RLC PDUs.

42. (Currently Amended) The user equipment apparatus according to
claim 35, wherein claims 35-41 characterized in that the user equipment
apparatus is user equipment of a UMTS or WCDMA system.

43-46. (Cancelled)